letter, the "ARPM-cost margin" for this service can be constructed.[23] The ARPM margins increase slightly over the ten year period (see Appendix A-Figure One), presenting a pattern not different in kind from the rising margins found using tariff rates in this affidavit and my book. Thus, even if we assume, contrary to reason, that ARPM is a "meaningful" measure of AT&T's "prices," we reach the same conclusion: AT&T's margins for interstate switched services have consistently increased over the past decade as market concentration has decreased - a result at odds with competitive market performance.[24]

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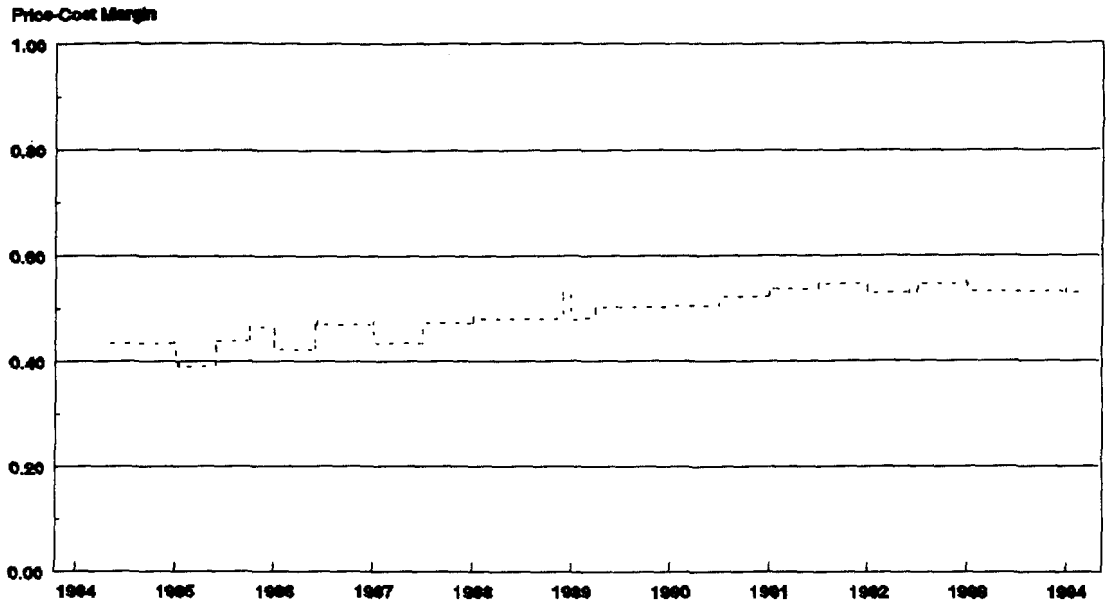
[23] The "ARPM-cost margin" equals ARPM minus marginal cost, divided by ARPM. The steps necessary to calculate this margin are as follows: (1) put Mr. Mandl's ARPM data in nominal terms; (2) net out switched access costs; and (3) divide by the nominal ARPM. Note that the identical margin would be obtained by (1) leaving Mr. Mandl's ARPM data in their inflation-adjusted form, (2) deflating the switched access costs and netting them out of the inflation-adjusted ARPM data; and (3) dividing by the inflation-adjusted ARPM. In other words, it makes absolutely no difference to the calculation of the margin whether ARPM and marginal costs are expressed in nominal or inflation-adjusted terms.

[24] Recently Professor Hall has used carriers' average revenue per minute to argue that long-distance prices have declined, net of access charges. *See* Hall, R. (1995). *Long Distance: Public Benefits from Increased Competition, 1995 Update*. His study is subject to the same errors afflicting the work of H&L.

APPENDIX A-FIGURE ONE
AT&T ARPM-COST MARGIN BASED ON INTERSTATE SWITCHED SERVICE



Sources: Marginal Costs from FCC; and Rates from October 4, 1994 Letter of Alex Mandl to FCC.

D. POINT FOUR: THE USE OF FINANCIAL DATA TO ASSESS COMPETITIVE PERFORMANCE IN LONG-DISTANCE MARKETS

23. Claiming to be dissatisfied with a direct test of market power based on price-cost margins,[25] H&L call for the use of other measures of market power.[26] They first offer accounting returns on assets to assess departures from competitive performance;[27] however, they emphasize *Tobin's q*, the ratio of a firm's stock market value to the replacement cost of its

[25] Elsewhere Professor Hubbard has written: "The price-cost margin, typically defined as price less marginal cost divided by price, has a long history of theoretical and empirical applications in industrial organization." Domowitz, I., Hubbard, R., and Petersen, B. (1986), *Business Cycles and the Relationship Between Concentration and Price-Cost Margins*, 17 RAND JOURNAL OF ECONOMICS 1. *See also* Carlton, D. and Perloff, J. (1994), MODERN INDUSTRIAL ORGANIZATION (New York: Harper Collins College Publishers, 2nd. ed.), pp. 360-66.

[26] Hubbard and Lehr Affidavit, December 1994, p. 34.

[27] *Id.*, p. 10.

assets, as their alternative profitability test of competitive performance.[28] With these measures, they find no evidence of excessive returns in 1993 by AT&T, MCI, and Sprint, and conclude that the firms are performing competitively. These measures, whatever their merit for other purposes, have been misapplied here, and the results provide no information on competitiveness.

1. *H&L's Use of Financial Ratios as Measures of Monopoly Power Go Against Accepted Learning in Applied Economics*

24. H&L argue that above-average accounting rates of return provide evidence of monopoly profits. Restricting their analysis to one year, 1993, H&L calculate after-tax operating income divided by total assets in long-distance service and find rates of return of 11.0, 9.1, and 9.0 percent, respectively, for AT&T, MCI, and Sprint. These returns are compared by H&L to an analogously measured 11.6 percent rate of return for an unspecified sample of manufacturing firms in the Standard and Poor's Compustat database in 1992.[29] From these results they conclude there is significant competition in long-distance service.[30]

25. H&L go against accepted learning in applied economics in asserting that accounting rates of return can be used to measure monopoly power. That use has been

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[28] Lindenberg, E. and Ross, S. (1981), *Tobin's q Ratio and Industrial Organization*, 54 JOURNAL OF BUSINESS 1.

[29] Hubbard and Lehr Affidavit, December 1994, p. 10.

[30] H&L's profit rate for AT&T comes directly from financial data that AT&T reports to the FCC as published in STATISTICS OF COMMUNICATIONS COMMON CARRIERS. H&L provide no source for their data on MCI and Sprint. Attempts to replicate their profit rate estimates for MCI and Sprint were impossible because H&L did not provide any information regarding how their estimates were made. If H&L's rate-of-return estimates for MCI and Sprint involved a fully distributed allocation of costs to determine which assets were "long-distance related," this would of course be arbitrary and misleading. As two of AT&T's economic experts, Baumol and Willig, have written: "Fully allocated cost figures and the corresponding rate of return numbers simply have zero economic content. They cannot pretend to constitute approximations to *anything*." Baumol, W., Koehn, M., and Willig, R. (1978), *How Arbitrary is "Arbitrary"? - or, Toward the Deserved Demise of Full Cost Allocation*, PUBLIC UTILITIES FORTNIGHTLY 21.

convincingly discounted in economics at least since 1983, when Fisher and McGowan stated that applying "accounting rates of return to draw conclusions about monopoly profits is a totally misleading enterprise."[31] Use of an accounting rate is erroneous because "only by the merest happenstance will the accounting rate of return . . . be equal to the economic rate of return. . . ."[32] H&L do not attempt to approximate the economic rate of return given that they estimate (1) returns in 1993 on (2) assets from investments from earlier years, and, by doing so, "fatally scrambl[e] up the timing"[33] of estimates of economic rates of return. AT&T's other consultants, B&W, reject accounting returns as credible measures of competitive performance. As they state: "In principle, if accounting conventions conformed to economic theory, one could use data on earnings and costs to estimate true economic profits. In practice, there is usually little reason to believe that this can be done with an acceptable level of accuracy, and long distance services are certainly no exception to the rule. Thus, little can be learned from an analysis of earnings per share or accounting rates of return."[34]

26. Such estimates of rates of return exhibit substantial variation from year to year. For example, Appendix A-Figure Two shows accounting rates of return for AT&T, MCI, Sprint, and the S&P 500 for the period 1979 to 1994. Rates of return for these companies exhibit more variation than does the S&P 500. According to H&L's analysis, the three firms had "market power" in years when their rates of return exceeded the S&P, e.g., MCI in 1989

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[31] Fisher, F. and McGowan, J. (1983), *On the Misuse of Accounting Rates of Return to Infer Monopoly Profits*, 73 AMERICAN ECONOMIC REVIEW 82.

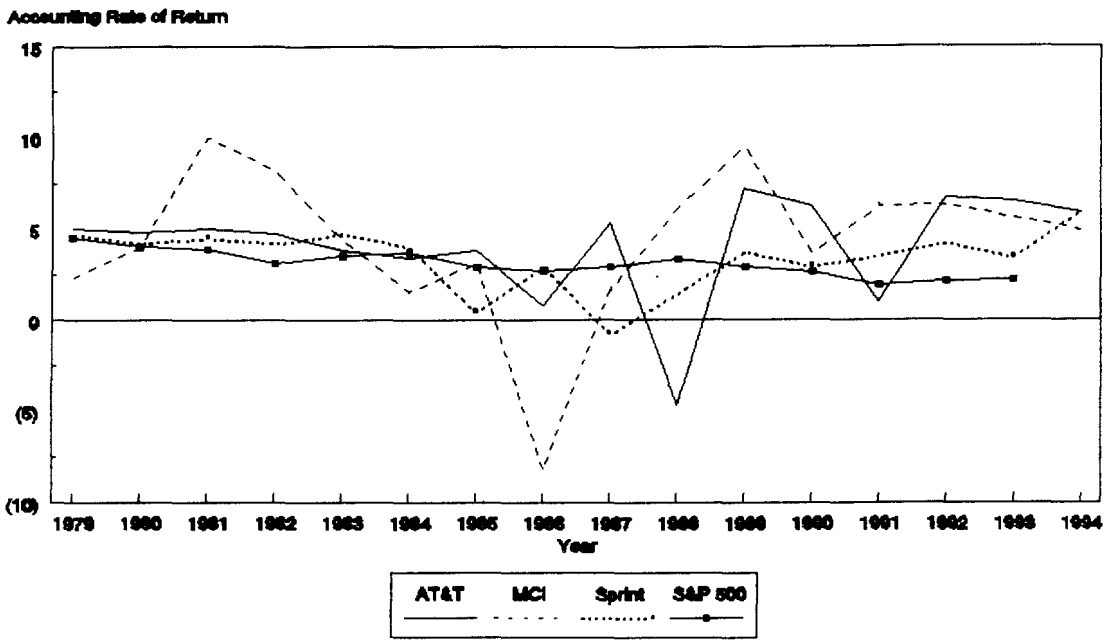
[32] *Id.*, p. 83.

[33] Fisher, F. (1984), *The Misuse of Accounting Rates of Return: Reply*, 74 AMERICAN ECONOMIC REVIEW 509.

[34] Bernheim and Willig's 1996 Manuscript, chapter two, p. 98.

with returns three times as large as that on the S&P 500. Since 1990, all three firms had H&L-defined "market power" each year (except AT&T in 1991).

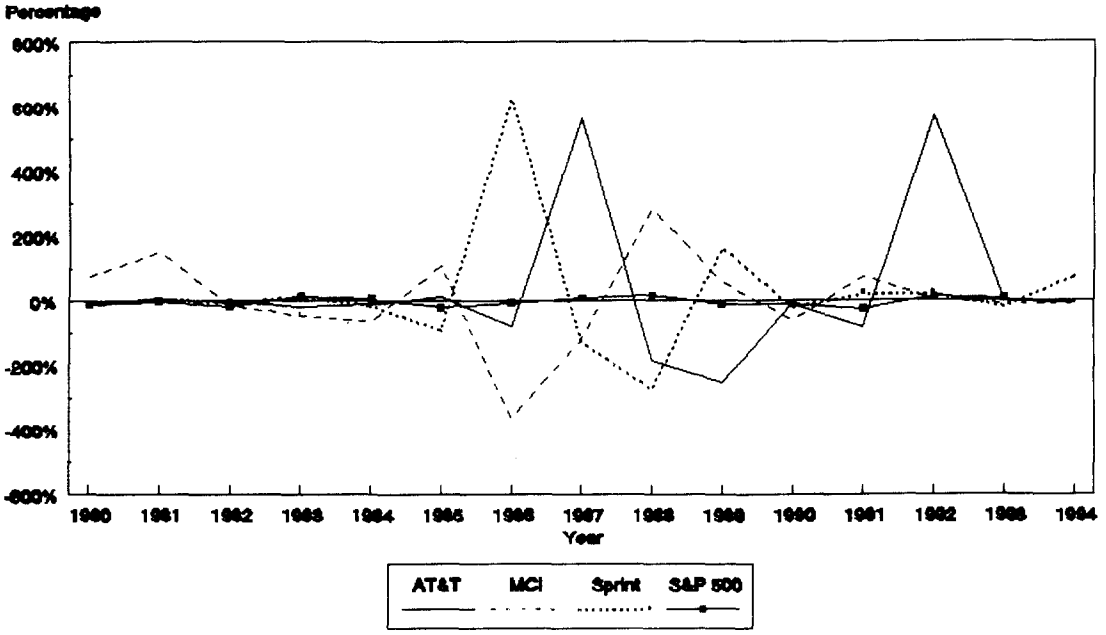
APPENDIX A-FIGURE TWO
ACCOUNTING RATE OF RETURN ON ASSETS
FOR AT&T, MCI, SPRINT, AND S&P 500



Source: Compustat.

27. Not much insight into the behavior of economic rates of return can be gained by examining annual changes. But, as shown in Appendix A-Figure Three, the percentage changes in the firms' returns exceed those of the S&P 500 by as much as 600 percent, and fall below those of the S&P 500 by as much as 365 percent for most of the period since divestiture. Rates of return for individual companies exhibit such variability over time that an examination of any one year, as undertaken by H&L, cannot yield meaningful information. Would H&L have us believe that AT&T gained "power" for two years, lost it for four, and then regained it for 1992-1994? This measure produces erratic, not significant behavior patterns.

APPENDIX A-FIGURE THREE
PERCENTAGE CHANGE IN ACCOUNTING RATE OF RETURN ON ASSETS
FOR AT&T, MCI, SPRINT, AND S&P 500



Source: Compustat.

28. Despite these conceptual problems with accounting rates of return, analysts keep going back to the data, after all they are available. But problems in obtaining estimates of price-marginal cost margins are overcome here because prices are readily observable (they are embedded in tariffs at the FCC), and the largest component of marginal costs (i.e., access costs) is reported by the FCC while the remaining component (i.e., network costs) is reported by carriers in rate hearings. We should use the preferred index of market power (i.e., the price-cost margin, also known as the "Lerner" index) with the data that by their nature are more accurate.

2. *H&L's Use of Tobin's q as a Measure of Competitiveness Has No Applicability in Long-Distance Telecommunications Markets*

29. H&L focus on *Tobin's q* as an alternative indicator of monopoly power. In their recent book manuscript, B&W also call for the use of *Tobin's q* as a superior measure of market power. *Tobin's q* measures the ratio of a firm's financial market value (common stock,

preferred stock, and debt) to the replacement cost of its assets. Firms in a competitive industry, assuming market value and replacement costs are measured properly, will have a q ratio of approximately one in long-run equilibrium. When q is greater than one, a firm is deemed by the financial markets to be worth more than the replacement cost of its assets, presumptively because it will earn a return in excess of the competitive level. In the absence of barriers to entry, markets in which the economic rate of return exceeds the cost of capital (adjusted for risk) attract entry by new firms, which puts downward pressure on price and thereby reduces q to one in the long run. In contrast, an efficient monopolist, protected by barriers to entry, will presumably earn profits in excess of the competitive rate of return on the assets employed, producing a q ratio greater than one, even in the long run.

30. As a threshold matter, it should be noted that the q ratio does not escape the pitfalls of accounting rates of return since it relies on accounting data for the estimation of replacement costs. For this and other reasons, there will always be a dispersion of firm q ratios in any given industry no matter its degree of competitiveness. Even in highly competitive industries, some firms will earn more than a competitive rate of return because of their application first of new technology, and not because they have monopoly power and thus the ability to control market price. More generally, replacement costs are always incorrectly measured as replacement costs of tangible assets. When the difference between market value and replacement costs is intangible assets, such as uncapitalized R&D and advertising, management quality, and anticipated future growth and profitability, none of which are necessarily related to monopoly power. Evidence of q ratios greater than one by no means indicates monopoly power.

31. H&L calculate q ratios for the 1987-1992 period of 0.46 for AT&T, 1.1 for Sprint, and 2.05 for MCI, concluding that the ratios for AT&T and Sprint provide no support for a presumption that investors in these companies believe that they possess "exploitable market power."[35] They state that MCI's high q ratio is due in part to a high q in 1989, but do not explain why MCI was thought to have monopoly power (only) in 1989. Even assuming the correctness of H&L's calculated market value and replacement costs for each company - and such measures are extremely difficult to measure accurately, particularly in telecommunications where old technology assets are carried on the books at historic value and would never be replaced with old technology - they have engaged in a futile exercise as far as assessing competition in long-distance markets. Their q ratios, especially for AT&T and Sprint, have no reference to the markets for long-distance services. They are based on the stock market assessments of revenues and replacement costs of assets for the entire corporate operations of AT&T, MCI, and Sprint and not specifically for long-distance markets.

32. Sprint's toll service revenues accounted for only 54 percent of its total revenues, with the remainder coming from the sale of local exchange service, cellular service, wholesale distribution of telecommunication equipment and products, and directory publishing services.[36] Also, some of Sprint's toll service revenues derived from the sale of international services which are not relevant for this inquiry. AT&T had an even wider variety of products and services, including: telecommunication products and services (such as voice products, and switching and transmission systems); voice, data, and image telecommunications; computer products and systems; installation, maintenance, and repair services for communication and computer

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[35] Hubbard and Lehr Affidavit, December 1994, p. 36.

[36] Sprint, 1993 ANNUAL REPORT.

products; optical fiber and copper cable manufacturing; electronic components for technology products; cellular and wireless communication; financing and leasing; and a general credit card business. AT&T's toll service revenues accounted for only 53 percent of its 1993 total revenues.[37] In contrast to Sprint and AT&T, the large majority (92 percent) of MCI's total revenues were derived from the sale of toll services, with some of these revenues deriving from the sale of (irrelevant) international services.[38] This fact might make MCI's high q more significant, except for measurement error.

33. H&L's analysis implicitly assumes that non-long-distance services and products have relevance in assessing competition in long-distance telecommunications markets. But it would be strange indeed for an economist to insist that a q ratio on General Motors should include replacement costs for Electronic Data Systems (when owned by General Motors), which designs, installs, and operates computer-based information systems, to draw conclusions on competition in automobile sales. For AT&T's q ratio to have applicability, H&L would have to argue that it is based on data limited to long-distance telecommunications markets, which is not the case.

34. B&W argue that this contamination of the q ratio with other lines of business is not necessarily a problem. Economic theory, they claim, implies that firms should not invest beyond the point where q falls below one. Therefore, if ". . . for the firm as a whole, q is consistently near unity, one can be reasonably confident that q is not significantly greater than unity for any large component of the firm's activities."[39] In this case H&L's ratios are near

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[37] FCC, STATISTICS OF COMMUNICATIONS COMMON CARRIERS; AT&T, 1993 ANNUAL REPORT.

[38] FCC, STATISTICS OF COMMUNICATIONS COMMON CARRIERS; MCI, 1993 ANNUAL REPORT.

[39] Bernheim and Willig's 1996 Manuscript, chapter two, p. 104.

one for Sprint but nowhere near one for AT&T and MCI. Since B&W state that a rational firm will not invest if q falls below one, and in the case of AT&T a ratio of 0.46 was found, H&L most likely seriously question AT&T's investments in computer companies, wireless companies, and other strategies in which it grossly overpays for assets. Whatever the merits of the q ratio in other contexts and applied to other firms, H&L's use of the ratio does not lead to credible findings on the competitiveness of interLATA long-distance service markets.[40] For these and other reasons they provide, B&W's conclusions that H&L's findings on q ratios show that AT&T, MCI, and Sprint do not have significant market power have neither theoretical nor empirical support and cannot be taken seriously.

E. Point Five: Calculating MTS Prices with Volume Weights

35. B&W allege that my analysis of discount plans is flawed because it uses weights based on the percentages of customers having different monthly usage levels (i.e., different monthly bills). B&W claim that using weights based on the volume of minutes would be superior. However, B&W's claim is based on a misunderstanding of how I calculated weighted-average discount MTS prices. They wrongly assume that all the weights in the LINK data shown in Appendix A-Table Two were used in each calculation. As explicitly stated in my book: "In some cases, low-volume usage levels caused prices to be higher under discount calling plans that under standard MTS. In those cases the discount prices *were excluded* from the weighted-average price calculation."[41]

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[40] Bernheim and Willig Affidavit, December 1994, p. 161. *See also* Carlton and Perloff, pp. 354-355.

[41] MacAvoy, P. (1996), The Failure of Antitrust and Regulation to Establish Competition in Long-Distance Telephone Service, Cambridge, MA: MIT and AEI Press, p. 123, note 12 (emphasis added).

36. Thus, my weighted-average prices only use as weights those customers with usage levels large enough to gain from participation in a discount plan. For example, consider a customer with a monthly bill of less than $10.99 for the month of January 1995. Given that customer's calling pattern (mileage and time of day), she would pay a lower rate with AT&T's standard MTS than with its *Reach Out America* discount plan (see Figure Twenty-Four of this affidavit). For this reason, when calculating the price for the *Reach Out America* plan, customers with monthly bills of less than $10.99 are excluded. This procedure vitiates the concern expressed by B&W that "it is hardly surprising to us that MacAvoy's indexes track basic rates rather closely - their construction guarantees this result."[42]

[42] Bernheim and Willig 1996 Manuscript, chapter two, p. 81.

APPENDIX A-TABLE TWO
LINK SURVEY DATA ON MONTHLY BILLS OF RESIDENTIAL CUSTOMERS
(PERCENTAGE OF CUSTOMERS HAVING MONTHLY BILLS IN THE INDICATED RANGES)

Monthly Bill	AT&T	MCI	Sprint
Up to $10.99	36	30	27
$11.00 to $14.99	5	4	4
$15.00 to $24.99	17	14	17
$25.00 to $34.99	13	15	15
$35.00 to $49.99	10	14	12
$50.00 to $74.99	9	10	12
$76.00 to $99.99	4	6	5
$100.00 to $149.99	3	2	6
$150.00 to $199.99	1	2	1
$200.00 to $249.99	1	2	1
Over $250.00	1	1	1

Source: LINK Resources Corp., 1993 HOME MEDIA CONSUMER SURVEY: RESIDENTIAL TELECOMMUNICATIONS, p. 106.

37. As a further check on the validity of B&W's claim that the use of volume-weighted discount MTS prices would change my results, I re-calculated the prices using B&W's preferred volume weights (see Appendix A-Table Three).[43] Not surprisingly, the volume-weighted prices and price-cost margins are nearly indistinguishable from the customer-weighted prices, given that the customer-weighted prices use only customers with monthly bills large

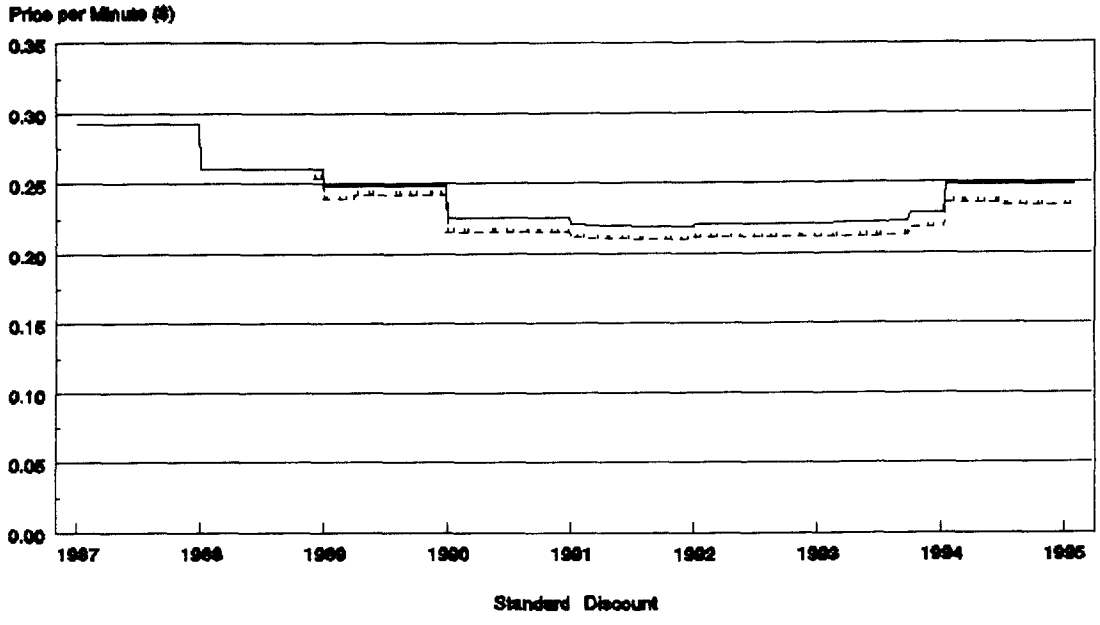
[43] The volume weights were calculated as specified by B&W, *see* Bernheim and Willig 1996 Manuscript, p. 56, note 106.

enough to gain from participation in a given discount MTS plan (see Appendix A-Figures Four to Fifteen). In sum, upon re-calculating the weighted-average discount MTS prices using B&W's preferred volume weights, no change in the observed pattern of rising price-cost margins occurs.

APPENDIX A-TABLE THREE
LINK SURVEY DATA ON MONTHLY BILLS OF RESIDENTIAL CUSTOMERS
(PERCENTAGE OF VOLUME OF CALLS FROM CUSTOMERS WITH
MONTHLY BILLS IN THE INDICATED RANGES)

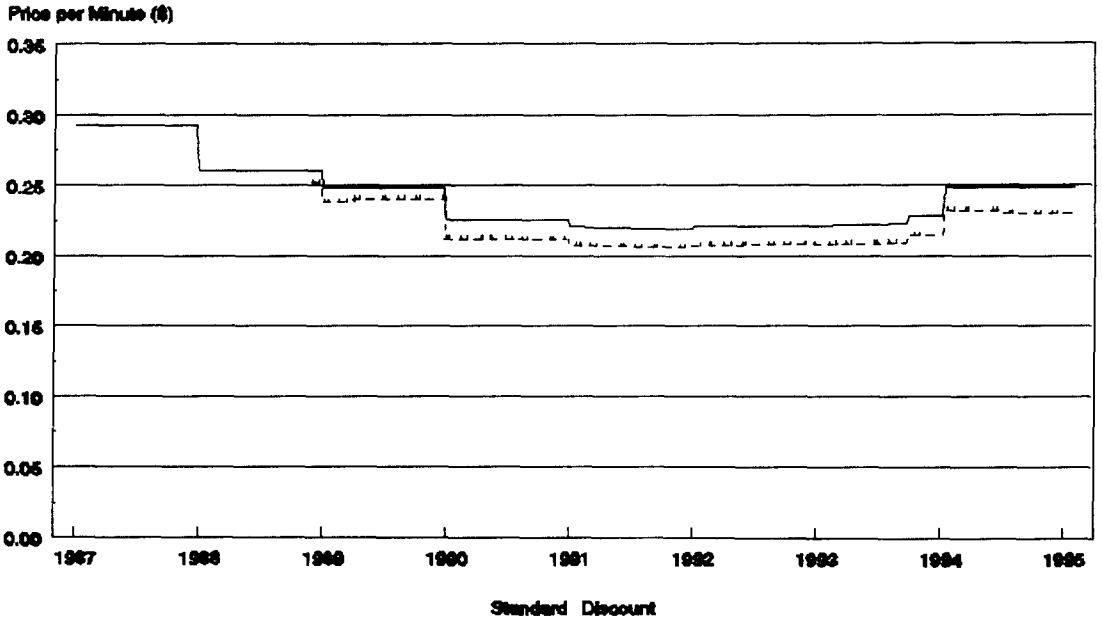
Monthly Bill	AT&T	MCI	Sprint
Up to $10.99	5.9	4.1	3.6
$11.00 to $14.99	1.9	1.3	1.3
$15.00 to $24.99	10.1	7.0	8.3
$25.00 to $34.99	11.6	11.3	11.0
$35.00 to $49.99	12.7	14.9	12.5
$50.00 to $74.99	16.8	15.7	18.3
$75.00 to $99.99	10.4	13.1	10.7
$100.00 to $149.99	11.2	6.3	18.3
$150.00 to $199.99	5.2	8.8	4.3
$200.00 to $249.99	6.7	11.3	4.3
Over $250.00	7.4	6.3	6.1

APPENDIX A-FIGURE FOUR
RESIDENTIAL INTERSTATE INDEX PRICES FOR AT&T STANDARD MTS SERVICE AND REACH OUT AMERICA DISCOUNT CALLING PLAN (BASED ON CUSTOMER WEIGHTS)



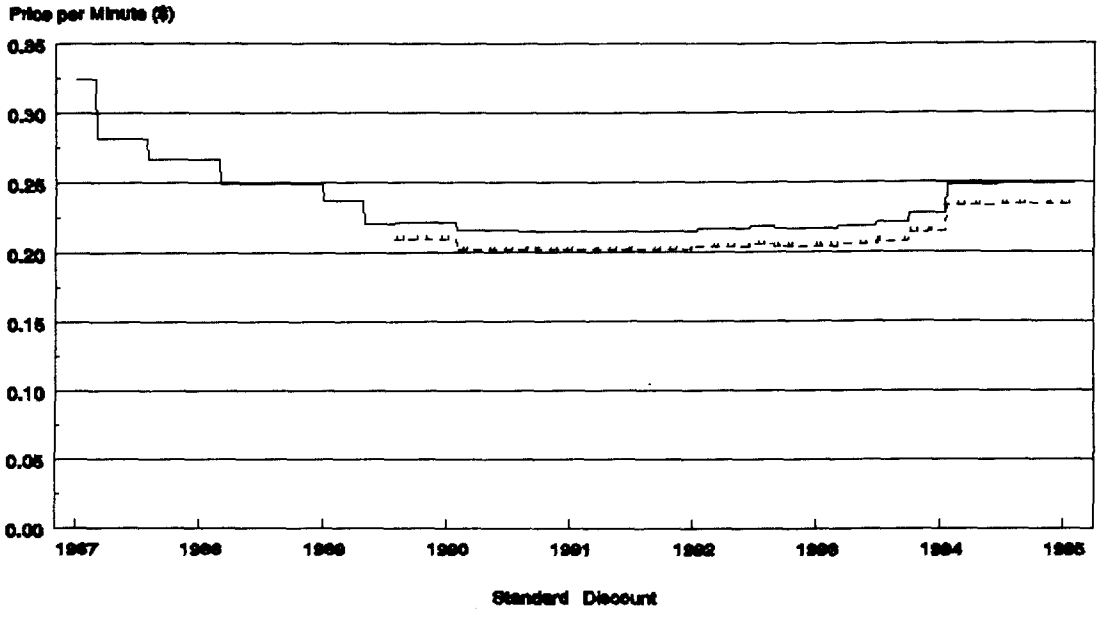
Note: Discount plan is Reach Out America Block of Time - One-Hour Plan with Day and Evening Option.

APPENDIX A-FIGURE FIVE
RESIDENTIAL INTERSTATE INDEX PRICES FOR AT&T STANDARD MTS SERVICE AND REACH OUT AMERICA DISCOUNT CALLING PLAN (BASED ON VOLUME WEIGHTS)



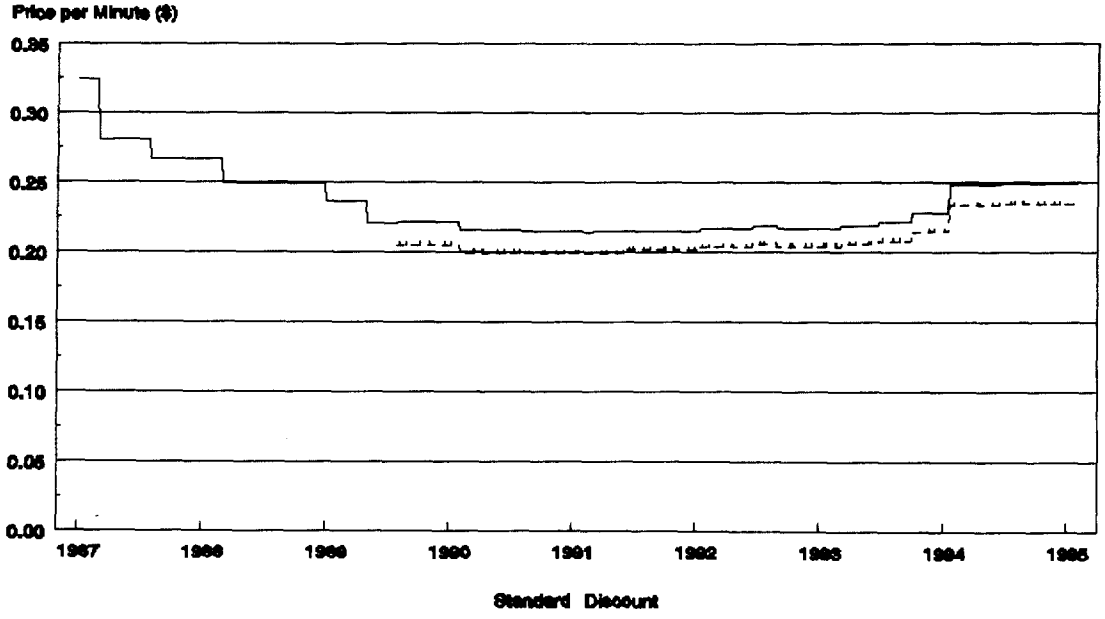
Note: Discount plan is Reach Out America Block of Time - One-Hour Plan with Day and Evening Option.

APPENDIX A-FIGURE SIX
RESIDENTIAL INTERSTATE INDEX PRICES FOR MCI STANDARD MTS SERVICE AND PRIME TIME DAY AND FRIENDS & FAMILY I DISCOUNT CALLING PLANS (BASED ON CUSTOMER WEIGHTS)



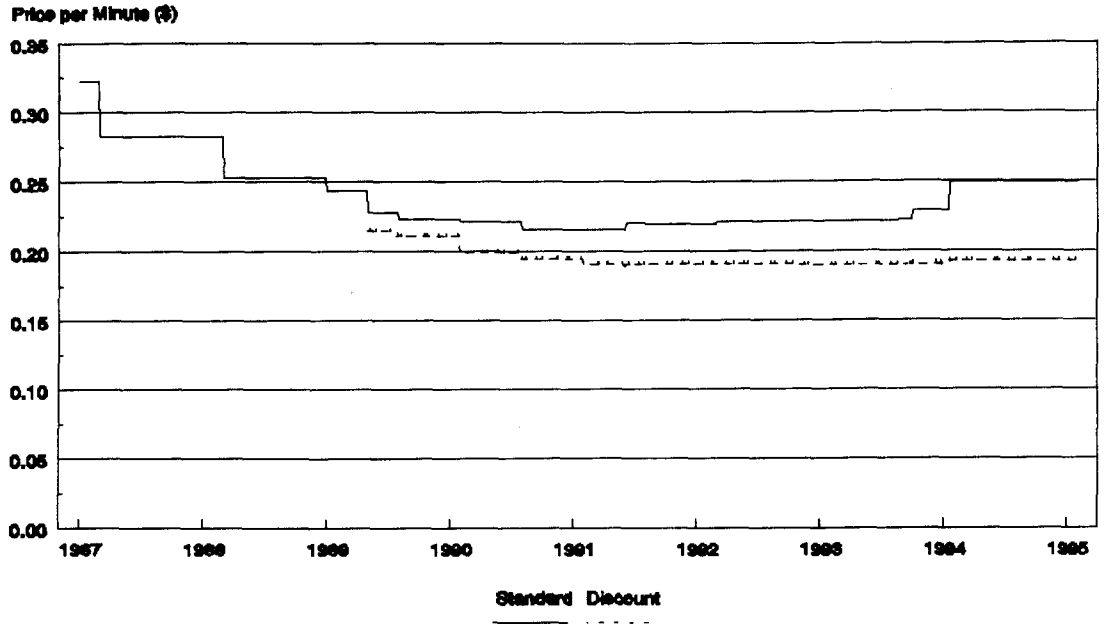
Note: Discount plan is Prime Time Day (8/1/89 to 5/31/91) and Friends and Family I (8/1/91 to 2/1/95).

APPENDIX A-FIGURE SEVEN
RESIDENTIAL INTERSTATE INDEX PRICES FOR MCI STANDARD MTS SERVICE AND PRIME TIME DAY AND FRIENDS & FAMILY I DISCOUNT CALLING PLANS (BASED ON VOLUME WEIGHTS)



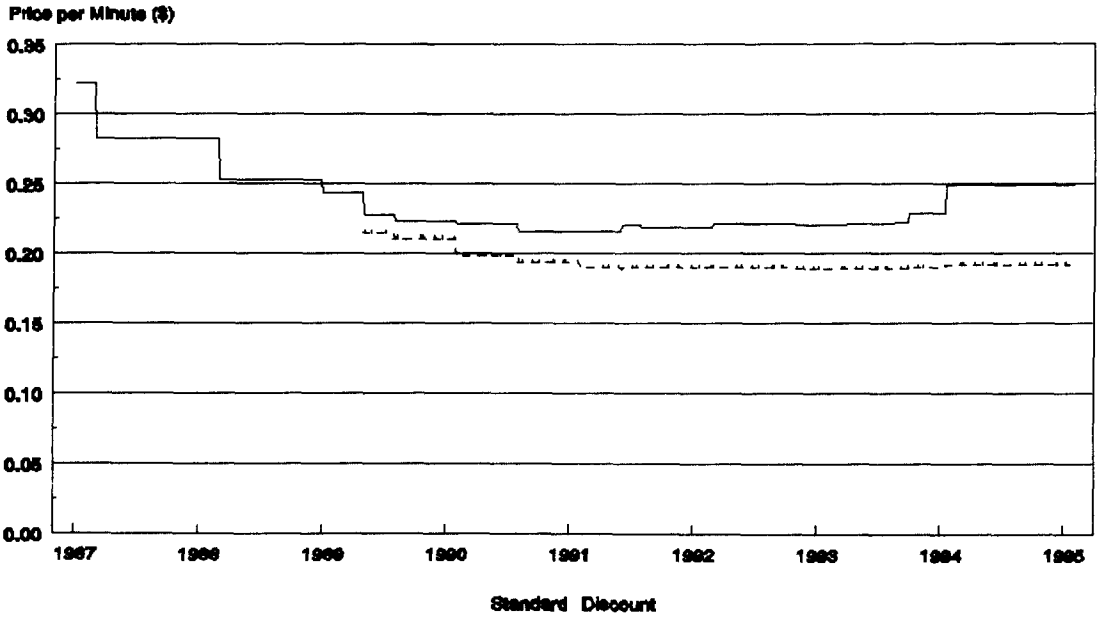
Note: Discount plan is Prime Time Day (8/1/89 to 5/31/91) and Friends and Family I (8/1/91 to 2/1/95).

APPENDIX A-FIGURE EIGHT
RESIDENTIAL INTERSTATE INDEX PRICES FOR SPRINT STANDARD MTS SERVICE AND SPRINT PLUS USAGE AND SPRINT SELECT DAY DISCOUNT CALLING PLANS (BASED ON CUSTOMER WEIGHTS)



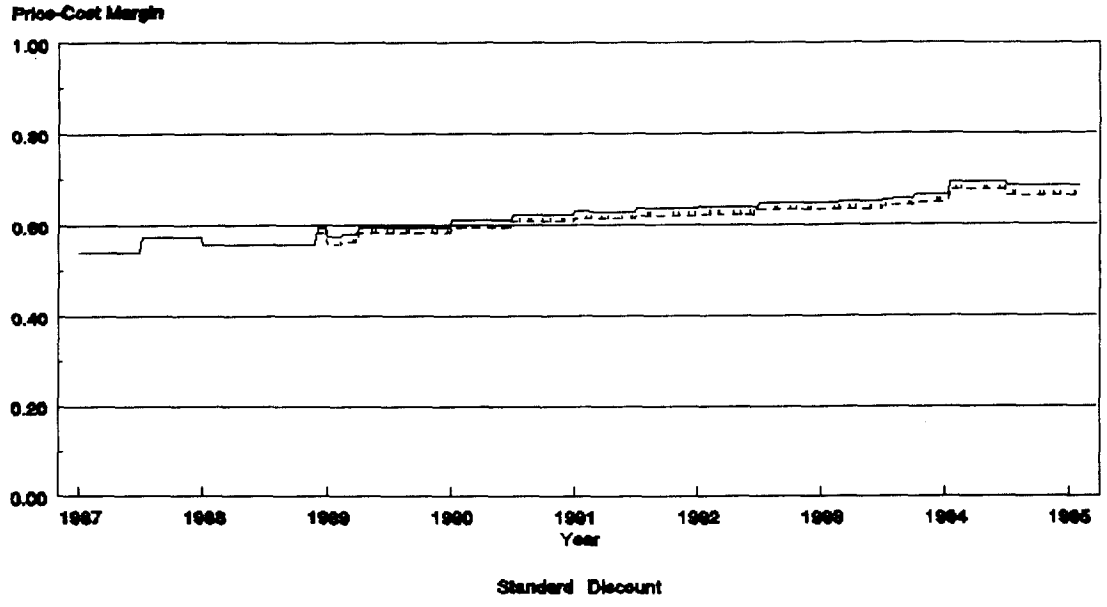
Note: Discount plan is Sprint Plus Usage Discounts (5/1/89 to 2/1/91) and Sprint Select Day Plan (2/1/91 to 2/1/95).

APPENDIX A-FIGURE NINE
RESIDENTIAL INTERSTATE INDEX PRICES FOR SPRINT STANDARD MTS SERVICE AND SPRINT PLUS USAGE AND SPRINT SELECT DAY DISCOUNT CALLING PLANS (BASED ON VOLUME WEIGHTS)



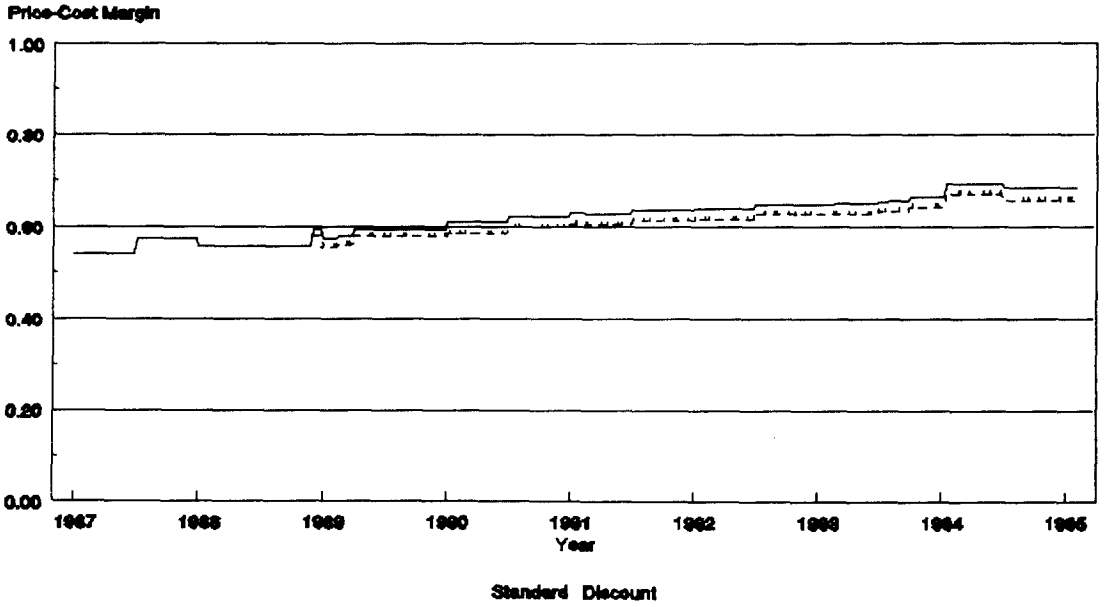
Note: Discount plan is Sprint Plus Usage Discounts (5/1/89 to 2/1/91) and Sprint Select Day Plan (2/1/91 to 2/1/95).

APPENDIX A-FIGURE TEN
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR AT&T STANDARD MTS SERVICE AND REACH OUT AMERICA DISCOUNT CALLING PLAN (BASED ON CUSTOMER WEIGHTS)



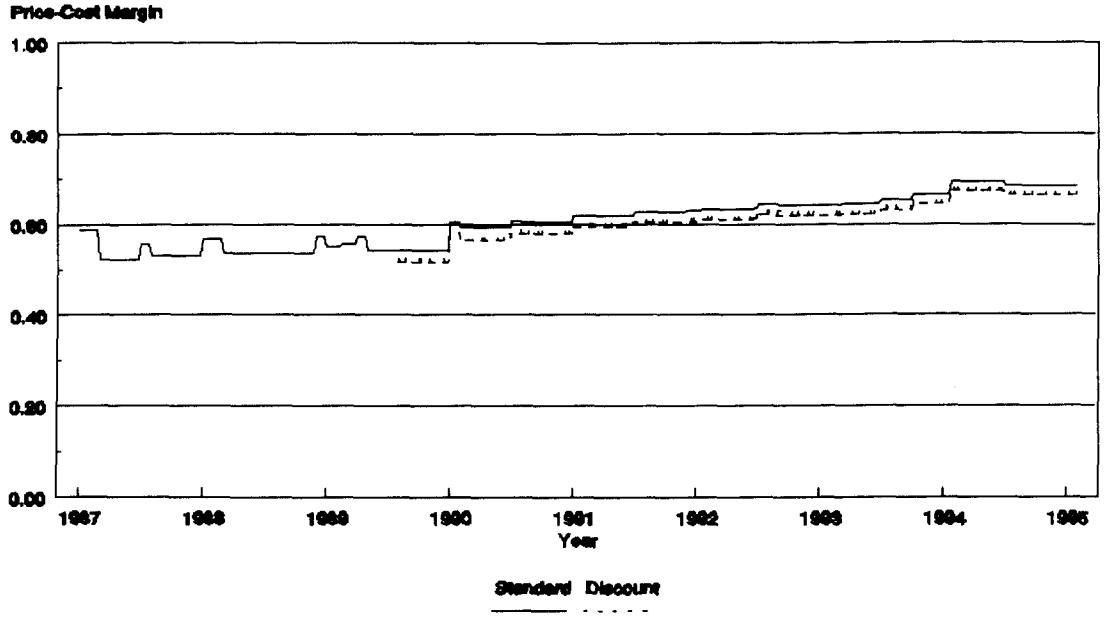
Note: Discount plan is Reach Out America Block of Time- One-Hour Plan with Day and Evening Option.
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

APPENDIX A-FIGURE ELEVEN
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR AT&T STANDARD MTS SERVICE AND REACH OUT AMERICA DISCOUNT CALLING PLAN (BASED ON VOLUME WEIGHTS)



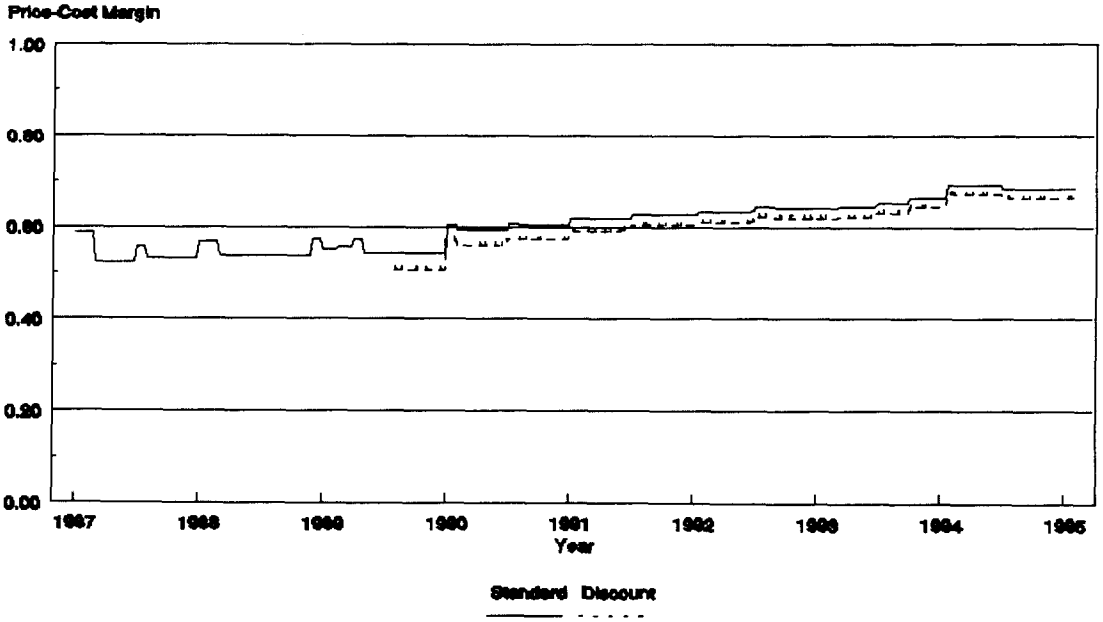
Note: Discount plan is Reach Out America Block of Time- One-Hour Plan with Day and Evening Option.
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

APPENDIX A-FIGURE TWELVE
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR MCI STANDARD MTS SERVICE AND PRIME TIME DAY AND FRIENDS & FAMILY I DISCOUNT CALLING PLANS (BASED ON CUSTOMER WEIGHTS)



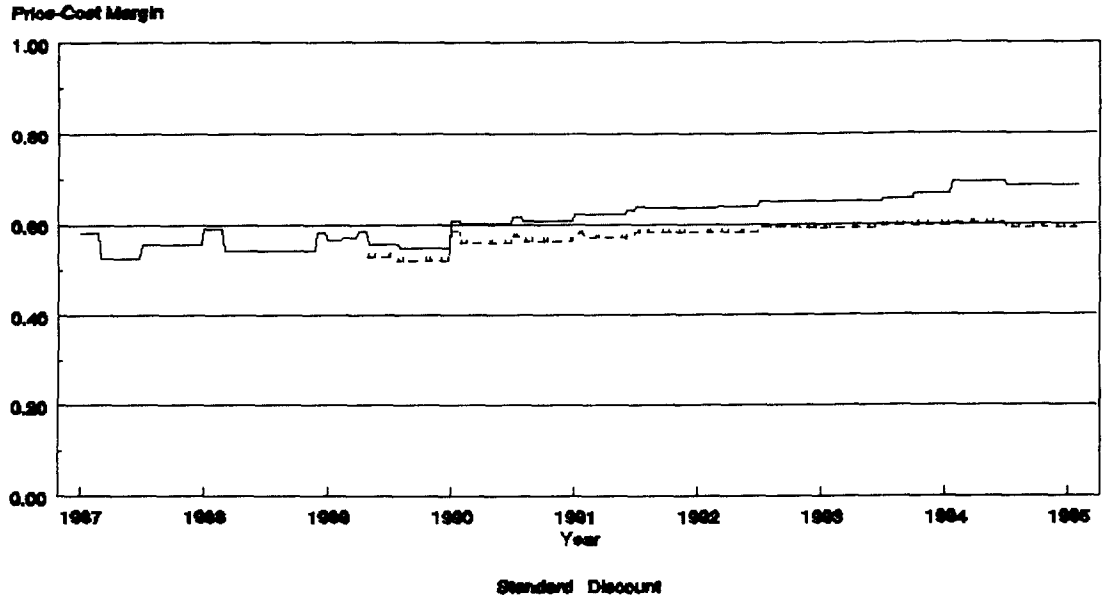
Note: Discount plan is Prime Time Day (6/1/88 to 5/31/91) and Friends and Family I (6/1/91 to 2/1/95).
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

APPENDIX A-FIGURE THIRTEEN
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR MCI STANDARD MTS SERVICE AND PRIME TIME DAY AND FRIENDS & FAMILY I DISCOUNT CALLING PLANS (BASED ON VOLUME WEIGHTS)



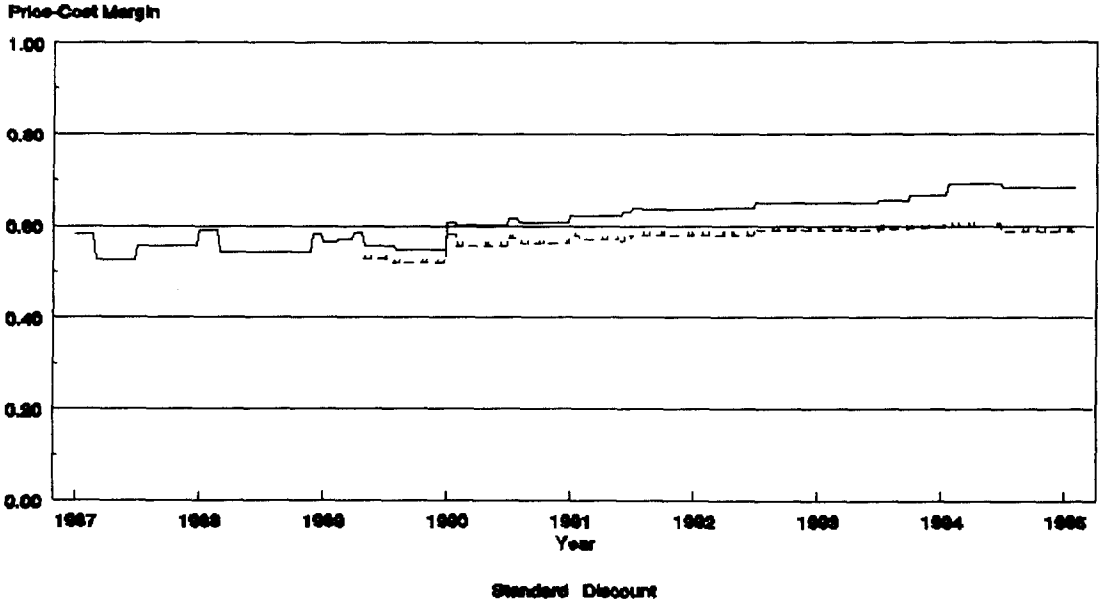
Note: Discount plan is Prime Time Day (6/1/88 to 5/31/91) and Friends and Family I (6/1/91 to 2/1/95).
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

APPENDIX A-FIGURE FOURTEEN
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR SPRINT STANDARD MTS SERVICE AND SPRINT PLUS USAGE AND SPRINT SELECT DAY DISCOUNT CALLING PLANS (BASED ON CUSTOMER WEIGHTS)



Note: Discount plan is Sprint Plus Usage Discounts (5/1/88 to 2/1/91) and Sprint Select Day Plan (2/1/91 to 2/1/95).
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

APPENDIX A-FIGURE FIFTEEN
RESIDENTIAL INTERSTATE PRICE-COST MARGINS FOR SPRINT STANDARD MTS SERVICE AND SPRINT PLUS USAGE AND SPRINT SELECT DAY DISCOUNT CALLING PLANS (BASED ON VOLUME WEIGHTS)



Note: Discount plan is Sprint Plus Usage Discounts (5/1/88 to 2/1/91) and Sprint Select Day Plan (2/1/91 to 2/1/95).
Sources: Marginal costs from FCC and rates from HTL Telemanagement, Ltd.

F. Point Six: The Analysis of Standard MTS Rates

38. B&W assert that my calculations of prices for MTS services are "transparently meaningless." While they do not provide an explanation for this allegation, B&W's complaint appears to involve two separate matters. First, they place a great deal of weight on the presence of discount MTS plans to support their competitiveness claim for residential services. But they agree that one-third of AT&T's customers cannot qualify for any discount MTS offered by that company.[44] Thus, focusing on rates for standard MTS certainly is not a "meaningless" exercise for the 21 million AT&T customers that pay such rates. Moreover, B&W concede that price-cost margins for AT&T's standard MTS service increased over the period 1991 to 1995.[45]

39. Second, B&W characterize the index prices reported in my recent book as "meaningless" even though they endorse similar index prices calculated by the FCC.[46] The FCC calculated index prices for customers with different monthly usage levels (50 minutes, 125 minutes, 250 minutes, 500 minutes, and 1,000 minutes) with each monthly price for a given usage level based on 60 different calling patterns (mileage and time of day). After reviewing the FCC's index prices, B&W conclude that the prices "tell the story of competition in the long distance marketplace."[47] Yet the FCC's index prices are calculated according to the same methodology as that used in my book, so the basis for B&W's statement that my index prices are "meaningless" appears lacking.

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[44] Bernheim and Willig 1996 Manuscript, chapter two, p. 55.

[45] Bernheim and Willig 1996 Manuscript, chapter two, p. 70.

[46] Bernheim and Willig 1996 Manuscript, chapter two, p. 70

[47] Bernheim and Willig 1996 Manuscript, chapter two, p. 70

G. POINT SEVEN: ARPM PRICES REPORTED BY B&W ARE LESS THAN AT&T'S *ONE RATE* PLAN

40. After summarizing their support for ARPM as a measure of price, B&W claim that the volume-weighted, ARPM fell to $0.135 per minute by July 1995.[48] This is a startling claim, the importance of which appears to have escaped B&W's attention. As B&W note in the next sentence of their report, AT&T's *One Rate* MTS calling plan has a price of $0.15 per minute. Thus, AT&T's new plan involves a rate increase - not a rate decrease. Either AT&T has misled the public when stating that *One Rate* is a significant new discount plan offering, or B&W's volume-weighted, ARPM rate of $0.135 must be wrong. In either case, the results do not affect the validity of my calculation of prices based on AT&T's tariff rates.

41. In this regard, B&W claim that AT&T's standard MTS rates are below cost for low-volume customers.[49] B&W assert that this (alleged) fact explains why standard MTS rates charged by AT&T, MCI, and Sprint tend to move in lock-step.[50] (Of course, even assuming *arguendo* the merits of B&W's claim, they do not offer any explanation as to why rates for discount MTS, inbound and outbound WATS, virtual network services, and Combined Services also have increased.) But since AT&T's rates are no longer regulated, this raises an interesting dilemma for B&W. If they are correct that AT&T's standard MTS rates for low-volume customers fall below its costs, they would have (implicitly) acknowledged that AT&T charges predatory prices. On the other hand, if they are incorrect and AT&T's standard MTS rates for low-volume customers exceed its costs, then their rationale for AT&T's price-increasing

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[48] Bernheim and Willig 1996 Manuscript, chapter two, p. 82.

[49] Bernheim and Willig 1996 Manuscript, chapter two, p. 41.

[50] Bernheim and Willig 1996 Manuscript, chapter two, pp. 40-42.

behavior disappears, so that they would have (implicitly) acknowledged its tacitly collusive behavior.

H. POINT EIGHT: PRICE-COST MARGINS VARY IN DIFFERENT LONG-DISTANCE MARKETS

42. B&W then suggest an empirical test of the tacit collusion theory in long-distance services markets using trends in price-cost margins.

> MacAvoy's reasoning implies that one should observe very different price-cost trends in different market segments. Specifically, collusion should have become possible sooner in segments where AT&T's market share fell more rapidly, such as outbound services for large commercial enterprises. But then price-cost margins should have risen earlier and more steeply in those segments than in segments where the erosion of AT&T's market share was more gradual.[51]

43. Accordingly, larger rates of increase of margins should be observed for outbound WATS services and virtual network services than for MTS and inbound WATS services. Contrary to B&W's statement that "[t]his is not what MacAvoy finds,"[52] the results confirm this specific hypothesized pattern of price-cost margins. This is their only test for competitiveness - they specify nothing with respect to changes in margins over time, or across markets with different elasticities of demand. On their singular test, Figures Thirteen to Fifteen in the text show that inbound (not outbound) WATS markets with greater rates of decline in HHI had the larger increases in price-cost margins.

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[51] Bernheim and Willig 1996 Manuscript, chapter two, p. 88.

[52] Bernheim and Willig 1996 Manuscript, chapter two, p. 88.

I. POINT NINE: THE NONEXISTENCE OF "MARKET SEGMENTS"

44. B&W allege that I have "fallen prey to the fallacy that it is proper to lump all retail long distance callers together for the purpose of calculating a single price. This ignores the fact that the market is segmented, and that one should properly expect different prices in different segments."[53] In particular, they are concerned that this analysis "obscures the importance of discounts because [my analysis] improperly lumps high volume customers together with low volume customers, even though there is no reason to believe that competition should produce discounts at low volumes."[54]

45. Contrary to B&W's view, according to the definition of a "market," a single price net of differences in costs should be calculated for all callers because, in fact, all of these callers pay the same tariff rate for the same call. One would expect different net prices in different segments only if these segments constituted separate markets.[55] B&W offer no evidence that separate markets exist in MTS. In addition, their suggestion that MTS prices should be calculated separately for high- and low-volume customers is inconsistent with their earlier assertion regarding resellers. That is, if large and small customers are in separate markets, then by definition arbitrage by resellers has been ineffective in bringing prices in line with cost of service differences. The fact that such segmentation can be accomplished by the three large carriers would yield an indication of market power, with profit gains made by discriminating among customers unable to arbitrage price differences. They bear the burden of proof that

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[53] Bernheim and Willig 1996 Manuscript, chapter two, p. 59.

[54] Bernheim and Willig 1996 Manuscript, chapter two, p. 59.

[55] *See* Stigler, G. and Sherwin, R. (1985), *The Extent of the Market*, 28 JOURNAL OF LAW AND ECONOMICS 555.

price-cost margins differ systematically by size of customer, and then they have to explain why that condition is not indicative of monopoly power.

J. POINT TEN: B&W'S CLAIM THAT PRICE-COST MARGINS SHOULD NOT BE USED TO MEASURE MARKET PERFORMANCE

46. B&W contend that the theory underlying my measure of competitive performance, the price-cost margin, is inapplicable to long-distance markets. As they state: "One would not, however, expect to observe marginal cost pricing in long distance under any circumstances. This is because interexchange carriers incur very substantial fixed costs. . . . If prices fell to marginal costs, all long distance companies would simply shut down, rather than lose money."[56]

47. Thus, B&W claim that AT&T's marginal costs are less than its average costs. If this claim were correct, AT&T would be a natural monopoly since a firm whose average costs exceed its marginal costs is by definition a natural monopoly.[57] But if AT&T were a natural monopoly, the FCC should regulate its prices (unless another carrier of the same scale, such as an operating company, "contests" its price at their common average costs). Moreover, if AT&T set its prices equal to its average cost, the remaining incumbent (smaller) facilities-based carriers could not profitably provide service because their costs necessarily would be higher. Thus we have two possibilities: (1) B&W have implicitly recommended that the FCC regulate AT&T's prices or induce operating company entry or (2) the claim that AT&T's average costs exceed its marginal costs must be wrong. In any event, B&W offer no evidence that AT&T's average

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[56] Bernheim and Willig 1996 Manuscript, chapter two, p. 73.

[57] Technically, declining average cost is a sufficient condition for proving the firm's cost function is subadditive. *See* Sharkey, W. (1982), THE THEORY OF NATURAL MONOPOLY, Cambridge, UK: Cambridge University Press, p. 59.

costs exceed its marginal costs, so their complaint against the use of price-cost margins for evaluating the performance of long-distance markets necessarily remains irrelevant.

K. POINT ELEVEN: STRUCTURAL CONDITIONS IN LONG-DISTANCE MARKETS DO OR DO NOT SUPPORT TACIT COLLUSION

48. In my previous writings and in this affidavit, I describe various conditions present in long-distance markets that are conducive to tacit collusion on the part of the major carriers. These conditions include: few carriers of competitive significance, stable market shares, homogeneous services, similar costs, barriers to entry, and observable price announcements before changes take effect. B&W assert that "an examination of [my] reasoning reveals numerous errors and misconceptions" with regard to these market conditions.[58] In this section, I address their concerns on each of these conditions.

1. *Number of Competitors*

49. Concentration of sellers is one indicator of a market's predisposition towards collusion. Although there is no consensus among economists as to the level of concentration at which collusion becomes feasible, the literature suggests that the range begins with the four largest sellers having a combined market share of 40 percent and extends to a 70 to 80 percent combined market share.[59] In 1995, the three largest carriers had 87 percent of interLATA toll

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[58] Bernheim and Willig 1996 Manuscript, chapter two, p. 46.

[59] *See, e.g.*, Carlton, D. and Perloff, J. (1994), MODERN INDUSTRIAL ORGANIZATION (New York: Harper Collins College Publishers, 2nd. ed.), p. 188; Posner, R. (1976), ANTITRUST LAW: AN ECONOMIC PERSPECTIVE, Chicago, IL: University of Chicago Press, pp. 55-56.